

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Jacques CHEVALLET et al.

Serial No. (unknown)

Filed herewith

PRESSURE MEASUREMENT
DEVICE COMPRISING A
MOTORIZED LOAD SENSOR
AND A PROCESS FOR
CONTROLLING THE DEVICE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please amend the above-identified application as follows:

IN THE ABSTRACT:

Cancel the Abstract as filed and add the Abstract on the accompanying sheet.

IN THE CLAIMS:

Claims 2-11 and 13-17 have been amended as follows:

--2. (amended) Device (10) according to claim 1, characterized in that the axial displacement means (58) comprise a device (74) for immobilizing the sensitive member (52), of the respective measurement section (16), in a chosen axial position.--

--3. (amended) Device (10) according to claim 1, characterized in that the axial displacement means (58) comprise a linear actuator (58) which is capable of axially displacing the load sensor (26) and its sensitive member (52).--

--4. (amended) Device (10) according to claim 1, characterized in that it comprises a load transmitter (52) which is inserted between the closure element (38) and the load sensor (26) which is fixed, and in that the displacement of the load transmitter (52), which is axial with respect to the load sensor (26), is controlled by a linear actuator (58).--

--5. (amended) Device (10) according to claim 3, characterized in that the linear actuator (58) comprises an electric motor (62) of the stepper-motor type.--

--6. (amended) Device (10) according to claim 1, characterized in that the closure element (38) is made in a single part with the associated rigid wall (34).--

--7. (amended) Device (10) according to claim 1, characterized in that the closure element (38) is moulded with the associated rigid wall (34).--

--8. (amended) Device (10) according to claim 1, characterized in that it comprises a control system which controls the axial displacement means (58) so that an initial calibration operation, which consists in choosing the axial position of the sensitive member (52), respectively of the

measurement section (16), with respect to the external face (42) of the closure element (38), respectively with respect to the axial end of the sensitive member (52), is carried out when the closure element (38) is in its rest state, this rest state corresponding to the absence of a pressure gradient between its external face (42) and its internal face (40).--

--9. (amended) Device (10) according to claim 8, characterized in that the control system controls the axial displacement means (58) so that, during the initial calibration operation, the axial displacement of the sensitive member (52) towards the external face (42) of the closure element (38), respectively the axial displacement of the measurement section (16) towards the axial end of the sensitive member (52), is provoked until to obtain an initial pretensioning force (F0) which is high enough so that the pressure measurement device (10) works in a linear region of the axial displacement means (58) where axial play has no effect on the pressure measurements.--

--10. (amended) Device (10) according to claim 1, characterized in that it comprises a control system which controls the axial displacement means (58) so that the response of the closure element (38) to a pretensioning force (F0) can be analysed as a function of an axial displacement of the sensitive member (52), respectively of the measurement section (16).--

--11. (amended) Device (10) according to claim 10, characterized in that the analysis of the response of the closure element (38) is aimed to determine an optimum pretensioning force (F0) for measurements of blood pressure greater than the ambient air pressure and for measurements of blood pressure less than the ambient air pressure.--

--13. (amended) Process according to claim 12, characterized in that the initial adjustment phase comprises an initial calibration operation, and that, during the initial calibration operation, the sensitive member (52), respectively the measurement section (16), is axially moved towards the external face (42) of the associated closure element (38), respectively towards the axial end of the associated sensitive member (52), up to a given axial position of reference in which the sensitive member (52) is in contact with the external face (42) of the closure element (38), with a view to establish a correlation between a given pretensioning force (F0) and the rest state of the closure element (38), this rest state corresponding to an absence of a pressure gradient between its external face (42) and its internal face (40).--

--14. (amended) Process according to claim 13, characterized in that, during the initial calibration operation, the sensitive member (52), respectively the measurement section (16), is axially moved towards the external face (42) of the closure element (38), respectively towards the axial end of the sensitive member (52), until the sensitive member

(52) applies an initial pretensioning force (F0) which is high enough so that the pressure measurement device (10) works in a linear region of the axial displacement means (58) where axial play has no effect on the pressure measurements.--

--15. (amended) Process according to claim 12, characterized in that the initial adjustment phase comprises an analysis phase, and that the analysis phase consists in analysing the response of the closure element (38) to a pretensioning force (F0) varying as a function of an axial displacement of the sensitive member (52), respectively of the measurement section (16).--

--16. (amended) Process according to claim 15, characterized in that the analysis phase is used for the purpose of identifying a fault in the structure of the closure element (38).

--17. (amended) Process according to claim 15, characterized in that the analysis phase is used for the purpose of determining an optimum pretensioning force (F0) for measurements of blood pressure greater than the ambient air pressure and for measurements of blood pressure less than the ambient air pressure.--

R E M A R K S

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The

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attached page is captioned "VERSION WITH MARKINGS TO SHOW
CHANGES MADE."

Respectfully submitted,

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December 7, 2001

ABSTRACT OF THE DISCLOSURE

A device for measuring the pressure of blood, intended to engage with a section (16) for measuring the pressure of blood, which section includes a membrane (38) which is axially deformable under the effect of the blood pressure and which is designed to be mounted on a support structure (20, 22) bearing especially a load sensor (26) arranged substantially facing the membrane (38), characterized in that it includes controlled elements (58) for the relative axial displacement of the sensitive member (52) of the load sensor (26), with respect to the support structure (20, 22), so that the axial position of the sensitive member (52) can be adjusted with respect to the external face (42) of the membrane (38), especially for the purpose of carrying out an initial calibration operation. The invention also proposes a process for controlling the device.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 2-11 and 13-17 have been amended as follows:

--2. (amended) Device (10) according to the preceding claim¹, characterized in that the axial displacement means (58) comprise a device (74) for immobilizing the sensitive member (52), of the respective measurement section (16), in a chosen axial position.--

--3. (amended) Device (10) according to ~~any one of the preceding claims~~^{Claim 1}, characterized in that the axial displacement means (58) comprise a linear actuator (58) which is capable of axially displacing the load sensor (26) and its sensitive member (52).--

--4. (amended) Device (10) according to ~~either of claims Claim 1 and 2~~, characterized in that it comprises a load transmitter (52) which is inserted between the closure element (38) and the load sensor (26) which is fixed, and in that the displacement of the load transmitter (52), which is axial with respect to the load sensor (26), is controlled by a linear actuator (58).--

--5. (amended) Device (10) according to ~~either of claims Claim 3 and 4~~, characterized in that the linear actuator (58) comprises an electric motor (62) of the stepper-motor type.--

--6. (amended) Device (10) according to ~~any one of the preceding claims~~^{Claim 1}, characterized in that the closure

element (38) is made in a single part with the associated rigid wall (34).--

--7. (amended) Device (10) according to the preceding claim⁷, characterized in that the closure element (38) is moulded with the associated rigid wall (34).--

--8. (amended) Device (10) according to ~~any one of the preceding claims~~ claim⁸, characterized in that it comprises a control system which controls the axial displacement means (58) so that an initial calibration operation, which consists in choosing the axial position of the sensitive member (52), respectively of the measurement section (16), with respect to the external face (42) of the closure element (38), respectively with respect to the axial end of the sensitive member (52), is carried out when the closure element (38) is in its rest state, this rest state corresponding to the absence of a pressure gradient between its external face (42) and its internal face (40).--

--9. (amended) Device (10) according to the preceding claim⁸, characterized in that the control system controls the axial displacement means (58) so that, during the initial calibration operation, the axial displacement of the sensitive member (52) towards the external face (42) of the closure element (38), respectively the axial displacement of the measurement section (16) towards the axial end of the sensitive member (52), is provoked until to obtain an initial pretensioning force (F0) which is high enough so that the

pressure measurement device (10) works in a linear region of the axial displacement means (58) where axial play has no effect on the pressure measurements.--

--10. (amended) Device (10) according to ~~any one of the preceding claims~~^{claim 1}, characterized in that it comprises a control system which controls the axial displacement means (58) so that the response of the closure element (38) to a pretensioning force (F0) can be analysed as a function of an axial displacement of the sensitive member (52), respectively of the measurement section (16).--

--11. (amended) Device (10) according to ~~the preceding claim 10~~, characterized in that the analysis of the response of the closure element (38) is aimed to determine an optimum pretensioning force (F0) for measurements of blood pressure greater than the ambient air pressure and for measurements of blood pressure less than the ambient air pressure.--

--13. (amended) Process according to ~~the preceding claim 12~~, characterized in that the initial adjustment phase comprises an initial calibration operation, and that, during the initial calibration operation, the sensitive member (52), respectively the measurement section (16), is axially moved towards the external face (42) of the associated closure element (38), respectively towards the axial end of the associated sensitive member (52), up to a given axial position of reference in which the sensitive member (52) is in contact

with the external face (42) of the closure element (38), with a view to establish a correlation between a given pretensioning force (F0) and the rest state of the closure element (38), this rest state corresponding to an absence of a pressure gradient between its external face (42) and its internal face (40).--

--14. (amended) Process according to ~~the preceding claim 13~~, characterized in that, during the initial calibration operation, the sensitive member (52), respectively the measurement section (16), is axially moved towards the external face (42) of the closure element (38), respectively towards the axial end of the sensitive member (52), until the sensitive member (52) applies an initial pretensioning force (F0) which is high enough so that the pressure measurement device (10) works in a linear region of the axial displacement means (58) where axial play has no effect on the pressure measurements.--

--15. (amended) Process according to ~~any one of claims 12 to 14~~, characterized in that the initial adjustment phase comprises an analysis phase, and that the analysis phase consists in analysing the response of the closure element (38) to a pretensioning force (F0) varying as a function of an axial displacement of the sensitive member (52), respectively of the measurement section (16).--

--16. (amended) Process according to ~~the preceding claim 15~~, characterized in that the analysis phase is used for

the purpose of identifying a fault in the structure of the closure element (38).

--17.---(amended) Process according to claim 15 or 16, characterized in that the analysis phase is used for the purpose of determining an optimum pretensioning force (F0) for measurements of blood pressure greater than the ambient air pressure and for measurements of blood pressure less than the ambient air pressure.--